

IN THE CLAIMS:

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1-76. (Cancelled)

77 (previously presented). A combination of a chemical mechanical polishing composition in contact with a substrate surface having at least one feature thereon comprising a noble metal, said combination comprising:

a substrate comprising submicron integrated circuits and having a surface having at least one feature thereon comprising a noble metal;

said substrate surface contacting a chemical mechanical polishing composition comprising: periodic acid and an abrasive in a combined amount sufficient to render the substrate surface substantially planar and to maintain a polishing rate of between 300 Angstroms per minute to about 2000 Angstroms per minute upon chemical-mechanical polishing thereof, wherein periodic acid is in an amount from about 0.05 to about 0.3 moles/kilogram.

78 (previously presented). The combination of claim 77, wherein periodic acid is in an amount from about 0.075 to about 0.3 moles/kilogram.

79 (previously presented). The combination of claim 77, wherein periodic acid is in an amount from about 0.075 to about 0.175 moles/kilogram.

80 (previously presented). The combination of claim 77, wherein the abrasive is in an amount from about 0.2 to about 6 weight percent.

81 (previously presented). The combination of claim 77, wherein the abrasive is in an amount from about 0.2 to about 4 weight percent.

82 (previously presented). The combination of claim 77, further comprising a pH-adjusting agent, wherein the pH is from about pH 5 to about pH 10.

83 (previously presented). The combination of claim 77, further comprising a pH-adjusting agent, wherein the pH is from about pH 1 to about pH 4.

84 (previously presented). The combination of claim 83, wherein the composition consists essentially of water, periodic acid, an abrasive, and a pH-adjusting agent is selected from a group consisting of a quaternary amine, an inorganic base, and any combination thereof.

85 (previously presented). The combination of claim 83, wherein the pH-adjusting agent comprises an agent selected from a group consisting of tetramethylammonium hydroxide, ammonium hydroxide, potassium hydroxide, sodium hydroxide, and any combination thereof.

86 (previously presented). The combination of claim 77, further comprising a suspension agent.

87 (previously presented). The combination of claim 86, wherein the suspension agent comprises an agent is selected from a group consisting of an organic acid, a surfactant, another abrasive, and ethyl carbonate.

88 (previously presented). The combination of claim 77, wherein the abrasive comprises an abrasive having a Mohs hardness number of greater than about 6.5.

89 (Currently Amended). The combination of claim 77, wherein the abrasive comprises an abrasive selected from a group consisting of alumina, silica, zirconia, spinel, zirconium nitride, ~~carbide~~, and any combination thereof

90 (Currently Amended). The combination of any one of claims 77 through 86, wherein the abrasive comprises alumina.

91 (Currently Amended). The combination of any one of claims 77 through 86, wherein the feature comprises a material selected from a group consisting of Ir, IrO₂, Pt, and any combination thereof.

92 (previously presented). The combination of claim 77, wherein said combined amount is sufficient to provide the substrate surface with a WWNU of less than about 12% upon polishing of the substrate surface with the composition.

93 (Currently Amended). The combination of claim 77, wherein said ~~combined amount is sufficient to provide the substrate surface with a WWNU of less than about 5%~~ noble metal is platinum, wherein said composition comprises an abrasive in an amount from about 0.2 to about 6 weight percent, said wherein said composition has a pH between about 1.2 and about 1.8, and wherein on polishing the substrate surface with the composition contacting the surface the selectivity of the composition for polishing the platinum over polishing the dielectric material is at least 1:1.

94 (Currently Amended). A combination of a chemical mechanical polishing composition in contact with a substrate surface having at least one feature thereon comprising a noble metal, comprising:

a substrate having a surface, wherein said surface a dielectric material and has at least one feature thereon comprising a noble metal, and wherein said surface is contacting a composition comprising:

periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram,; and

an abrasive in an amount from about 0.2 to about 6 weight percent, said composition having a pH ~~selected from a group consisting of a pH from about pH 1 to less than pH 2 and a pH from above pH 5 to about pH 10;~~

and wherein on polishing the substrate surface with the composition contacting the surface the selectivity of the composition for polishing the noble metal-containing material over polishing the dielectric material is at least 1:1.

95 (previously presented). The combination of claim 94, wherein the amount of periodic acid is from about 0.075 to about 0.3 moles/kilogram.

96 (previously presented). The combination of claim 94, wherein the amount of periodic acid is from about 0.075 to about 0.175 moles/kilogram

97 (previously presented). The combination of claim 94, wherein the amount of the abrasive is from about 0.2 to about 4 weight percent.

98 (previously presented). The combination of claim 94, wherein the pH is from about pH 6 to about pH 10.

99 (previously presented). The combination of claim 94, further comprising a pH-adjusting agent.

100 (previously presented). The combination of claim 99, wherein the pH-adjusting is selected from a group consisting of a quaternary amine, an inorganic base, and any combination thereof.

101 (previously presented). The combination of claim 99, wherein the pH-adjusting agent comprises an agent selected from a group consisting of tetramethylammonium hydroxide, ammonium hydroxide, potassium hydroxide, sodium hydroxide, and any combination thereof.

102 (previously presented). The combination of claim 94, further comprising a suspension agent.

103 (previously presented). The combination of claim 102, wherein the suspension agent comprises an agent selected from a group consisting of an organic acid, a surfactant, another abrasive, and ethyl carbonate.

104 (previously presented). The combination of claim 94, wherein the abrasive comprises an abrasive having a Mohs hardness number of greater than about 6.5.

105 (Currently Amended). The combination of claim 94, wherein the abrasive comprises an abrasive selected from a group consisting of alumina, silica, zirconia, spinel, zirconium nitride, ~~carbide~~, and any combination thereof.

106 (Currently Amended). The combination of any one of claims 94 through 102, wherein the abrasive comprises alumina.

107 (Cancelled).

108 (previously presented). The combination of claim 94, wherein said composition provides the substrate surface with a WTWNU of less than about 5% upon chemical-mechanical polishing thereof.

109 (previously presented). The combination of claim 94 wherein the feature comprises Ir.

110 (previously presented). The combination of claim 94, wherein the feature comprises IrO₂.

111 (previously presented). The combination of claim 94, wherein the feature comprises platinum.

112 (Currently Amended). A combination of a composition in contact with a substrate surface having at least one feature thereon comprising a noble metal, comprising:

A) a composition consisting essentially of:

- 1) water;
- 2) periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram;
- 3) a first alumina abrasive in an amount from about 0.2 to about 6 weight percent;

4) optionally, a pH-adjusting agent in an amount sufficient to cause the pH of the slurry to be between about 1 to about 4 or between about 5 to about 10;

5) optionally, a suspension agent; ~~and~~

~~6) optionally, an electrolyte, wherein said composition is contacting~~

B) a substrate surface having at least one feature thereon comprising a noble metal.

113 (previously presented). The combination of claim 112 wherein the composition includes at least one pH-adjusting agent selected from a group consisting of a quaternary amine, an inorganic base, and any combination thereof.

114(previously presented). The combination of claim 112, wherein the composition consists essentially of:

1) water;

2) periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram;

3) an alumina abrasive in an amount from about 0.2 to about 6 weight percent; and

4) a pH-adjusting agent in an amount sufficient to cause the pH of the slurry to be between about 1 to about 4 or between about 5 to about 10.

115 (previously presented). The combination of claim 114, wherein the pH of the slurry is between about 1 to about 4.

116 (previously presented). The combination of claim 114, wherein the pH of the slurry is between about 5 to about 10.

117 (previously presented). The combination of claim 112, wherein the composition includes at least one suspension agent is selected from a group consisting of an organic acid, a surfactant, another abrasive, and ethyl carbonate.

118 (Currently Amended). The combination of claim 112, wherein the composition consists essentially of:

1) water;

- 2) periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram;
- 3) an alumina abrasive in an amount from about 0.2 to about 6 weight percent; and
- 4) optionally a pH-adjusting agent in an amount sufficient to cause the pH of the slurry to be between about 1 to about 4 or between about 5 to about 10; and
- 5) a suspension agent ~~;~~and
- ~~6) optionally, an electrolyte.~~

119 (previously presented). The combination of claim 118, wherein the suspension agent is an organic acid.

120 (previously presented). The combination of claim 118, wherein the suspension agent is a surfactant.

121 (previously presented). The combination of claim 118, wherein the suspension agent is ethyl carbonate.

122 (previously presented). The combination of claim 118, wherein the suspension agent is a material having a CAS number of CAS#1344-28-1.

123 (previously presented). The combination of claim 118, wherein the suspension agent comprises a hydrous sodium lithium magnesium silicate.

124 (previously presented). The combination of claim 118, wherein the suspension agent comprises ammonium polymethacrylate.

125 (previously presented). The combination of claim 118, wherein the suspension agent comprises colloidal silica.

126 (previously presented). The combination of claim 118, wherein the suspension agent comprises a surfactant.

127 (previously presented). The combination of claim 118, wherein the suspension agent comprises an organic acid.

128 (previously presented). The combination of claim 118, wherein the suspension agent comprises succinic acid.

129 (previously presented). The combination of claim 118, wherein the suspension agent comprises a second abrasive different from the first abrasive.

130 (previously presented). The combination of claim 112, wherein the feature comprises Ir.

131 (previously presented). The combination of claim 112, wherein the feature comprises IrO₂.

132 (Currently Amended). The combination of claim ~~112~~ 77, wherein the feature comprises platinum and wherein the composition comprises ammonium chloride.

133 (previously presented). The combination of claim 112, wherein the feature comprises gold.

134 (previously presented). The combination of claim 112, wherein the feature comprises silver.

135 (previously presented). The combination of claim 112, wherein the first abrasive consists essentially of *alpha*-alumina.

136 (previously presented). The combination of claim 112, wherein the first abrasive consists essentially of *gamma*-alumina.

137 (previously presented). The combination of claim 112, wherein the first abrasive consists essentially of *alpha*-alumina and *gamma*-alumina.

138 (previously presented). The combination of claim 122, wherein the substrate further comprises a dielectric material, and wherein the selectivity of the composition for polishing the noble metal-containing material over polishing the dielectric material is at least 1:1.

139 (previously submitted). The combination of claim 122, wherein the substrate further comprises a dielectric material, and wherein the selectivity of the composition for polishing the noble metal-containing material over polishing the dielectric material is about 1:1.